



## Description of the final instar nymphs of seven species from *Anacroneuria* Klapálek (Plecoptera: Perlidae) in Costa Rica, and first record for an additional genus in Central America

PABLO E. GUTIÉRREZ-FONSECA<sup>1</sup> & MONIKA SPRINGER<sup>2</sup>

<sup>1</sup>Escuela de Biología, Universidad de Costa Rica. 2060, San José, Costa Rica. Current address: Institute for Tropical Ecosystem Studies, University of Puerto Rico. E-mail: gutifp@gmail.com

<sup>2</sup>Centro de Investigaciones en Ciencias del Mar y Limnología (CIMAR) and Escuela de Biología, Universidad de Costa Rica. E-mail: monika.springer@ucr.ac.cr

### Abstract

The final nymphal stages for seven species of *Anacroneuria* Klapálek from Costa Rica are described for the first time based upon reared specimens: *A. benedettoi* Stark, 1998, *A. divisa* (Navás, 1924), *A. holzenthali* Stark, 1998, *A. lineata* (Navás, 1924), *A. marca* Stark, 1998, *A. perplexa* Stark, 1998 and *A. varilla* Stark, 1998. Illustrations are provided for all important morphological characters and distinguishing characters are discussed. Distribution maps for each species are provided and remarks on the ecology are included. Finally, an additional genus is recorded for Central America for the first time, from two nymphs collected from the Central Valley in Costa Rica, possibly belonging to the genus *Perlesta*.

**Key words:** *Anacroneuria*, aquatic insects, nymphs, taxonomy, Neotropics, Central America

### Introduction

In Costa Rica, 25 species of stoneflies are known up to date, all from the genus *Anacroneuria*, family Perlidae (Stark 1998). The genus is apparently the most species rich in the order Plecoptera with 332 species currently recognized (Froehlich 2010), and distributed from the Southern United States (Texas, Arizona), through Central America to Northern Argentina, Bolivia and Brazil (Stark 1995, Stark 2001, Stark *et al.* 2009).

The most important revision of the genus for Central America was published by Stark (1998), when he described 18 species new to science for Costa Rica and Panama, 12 of which were reported exclusively from Costa Rica. The vast majority of the 27 species known from Costa Rica and Panama have been described only in the adult stage (Table 1). The nymphs of only three species occurring in Costa Rica have been described: *A. maritza* Stark (Stark 1998), *A. uatsi* Stark (Stark 1998), and *A. talamanca* Stark (Fenoglio 2007). In this work, we describe the final instar nymph for an additional seven species of *Anacroneuria* and provide information about their habitat and distribution throughout Costa Rica.

### Material and methods

In order to obtain mature nymphs of *Anacroneuria*, 80 sites from 57 different rivers and streams throughout the country were visited (some of them on several occasions). Nymphs collected at these locations were brought to the laboratory for rearing. Up to four nymphs were reared in one container with well-oxygenated water and a medium size stone reaching above water level. Nymphs were fed oligochaetes and chironomid larvae. A total of 547 individuals were reared successfully to adulthood. Adults were preserved together with the nymphal exuvia in 70% EtOH and identified to species following the procedures and taxonomic keys presented by Stark (1998). All specimens were deposited in the aquatic entomology collection of the Zoological Museum at the University of Costa Rica (MZUCR).